



Accelerator Science Activities at the Lab and IT Needs

Vladimir Shiltsev, APC

October 12, 2011

3 Components – ALL Important



- Operations (air and water)
- Projects (bread and butter)
- Science and R&D (secure our future)
- *Some 120 people in the lab who are Accelerator Scientists, Physicists and Accelerator R&D Engineers ... +some 700 support*

Bread and Butter



- Projects - Contacts/ Liaisons

- ILC/SRF/GDE (R.Kephart , R.Stanek – N.Solyak)
- LARP (E.Prebys – A.Valishev)
- Project X (S.Holmes, S.Nagaitsev – N.Solyak)
- Mu2e (R.Ray – N.Mokhov)
- LBNE (J.Strait – N.Mokhov)
- G-2 (C.Polly – N.Mokhov)
- NOVA (P.Derwent – V.Shiltsev)

- Upgrades/Operation

- PIP (R.Webber – R.Zwaska)

To satisfy Projects needs

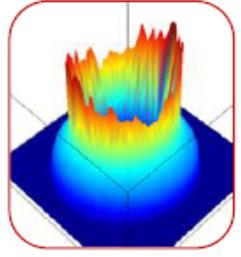


- Usually need 24/7 access to clusters
 - Heimdall
 - Wilson (via Comp Div)
- Timeline often very pressing
 - Situation varies quickly (CD process)
 - Scientists need as full control of the resource as possible
 - Mokhov et al – ED simulations
 - Solyak et al – Project X design tracking
- Plan to extend capabilities
 - Like Wilson cluster .. Limited funds to expand



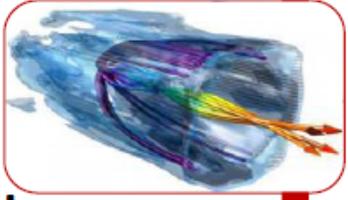
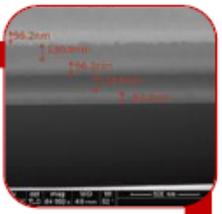
Building the Future

Future Colliders



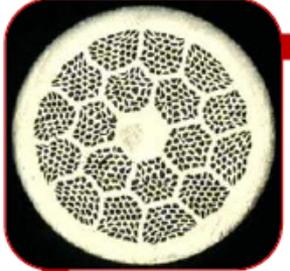
LARP
MAP
Tevatron, RHIC
ILC, ELIC

New Methods



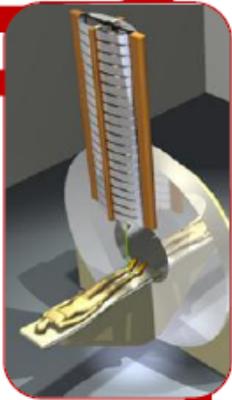
Laser Plasma
Beam Plasma
DWA, μ -structures
Petascale modeling

Nb_3Sn magnets
HTS conductor
SC RF
extreme NC RF



New Technologies

Compact FELs
Medical
AWT
ADS

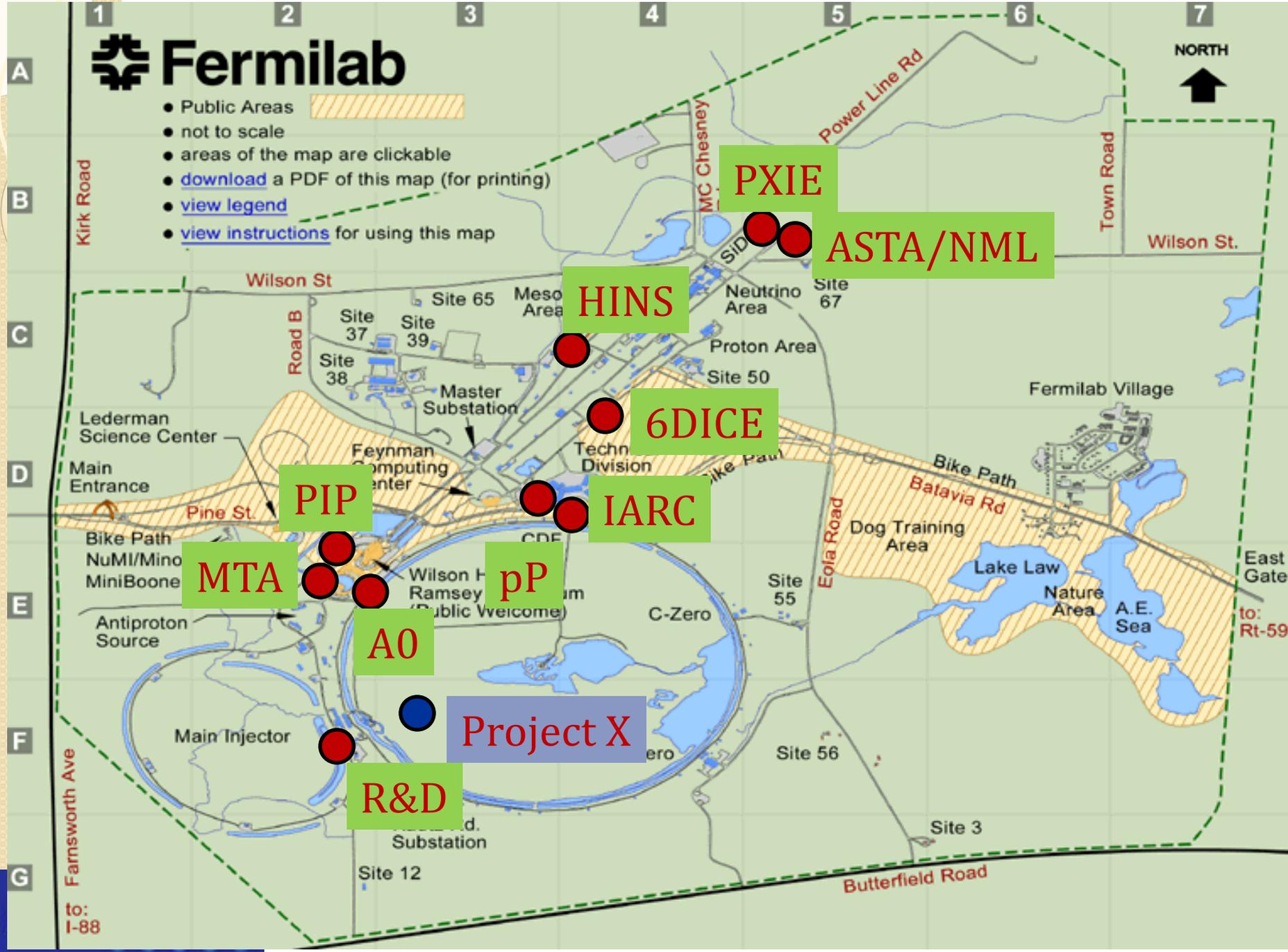


90
Th
232.04

Applications

Fermilab

- Public Areas 
- not to scale
- areas of the map are clickable
- [download](#) a PDF of this map (for printing)
- [view legend](#)
- [view instructions](#) for using this map



PIP

MTA

A0

R&D

Project X

pP

IARC

6DICE

HINS

PXIE

ASTA/NML

Farnsworth Ave
to: I-88

East Gate
to: Rt-59

MAP (Muon Accelerator Program)

- **Deliver on MICE experiment in UK**
 - Coupling coils and spectrometers
 - MICE experiment
- **RF studies in MTA at Fermilab**
 - Finish HP RF, Be-cavities
- **Design and Simulation effort**
 - MDI, Pr-X rings, Front-End, IDS-NF
 - Requires IT support

Advanced Accelerator R&D



- **ASTA (aka NML AARD):**
 - Design&construction IOTA ring
 - Design DEEX line
 - Design and installation e-gun & 40 MeV line
- **A0 facility:**
 - Finish current expt's (elliptic beam)
 - Transform A0 to HBESL lab
- **Theory/Modeling:**
 - E-cloud, SC, beam-beam, optics, tracking (CD)

Other Notable Activities



- 5 Peoples Fellows :
 - ProtoPlasma experiment
- 5 Joint Appointments NIU, IIT, ICL
- 9 PhD Students
- 14-15 Summer Students
- SBIR companies e.g. Muons, Inc
- US Particle Accelerator School
- IARC plans

To satisfy Acc-Science needs



- Very few jobs requiring massive computing
 - Mostly coordinated by Panagiotis + MAP and LARP
- Scientists value very much the clusters which they have control of
 - Not always appreciate that effort is needed to keep things running
- Time pressure as everywhere else
 - Delays irritate as much as for projects
- Medium-small scale experiments/facilities need generous Controls support (usually – for free)